



Identifying Entrepreneurial Potential? An Investigation of the Identifiers and Features of Entrepreneurship

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Abstract. The paper reports a study of entrepreneurship potential amongst students at one university using a quantitative instrument to measure three of the most commonly cited predictors: access to entrepreneurial role models; urgency of entrepreneurial intent; and desire for economic autonomy. The paper reports also on qualitative interviews with those identified as most and least likely to become entrepreneurs by the measure. Results suggest that the measure is effective and that there is variation between those most and least likely to become entrepreneurs and commonalities amongst those most likely to become entrepreneurs. Of the three predictors ‘desire for economic autonomy’ is most influential, but the generation of this ‘desire’ involves various internal and external influences. Findings are of interest to educators insofar as they might identify the stage of entrepreneurial development of students and develop appropriate pedagogic responses. It has implications also for policy aimed at encouraging entrepreneurship, and entrepreneurship support.

Keywords: entrepreneurship, entrepreneurial potential, education, ambition, self-efficacy, personality, environment.

1. Introduction

The paper reports a study that uses a large group of students in a UK university to examine three of the most commonly cited predictors of entrepreneurship.² These

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1. The authors would like to acknowledge with thanks the comments and suggestions made by the two anonymous referees which contributed most usefully to the development of the paper.
 2. The current study defines entrepreneurship as entrepreneurial business ownership, i.e., that involving growth, innovation, risk, etc., or as applying to “a person who habitually creates and innovates to build something of recognisable value around perceived opportunities” (Bolton and Thompson, 2004:16). Since the current study generally is concerned with prediction, business creation and self-employment are taken as measures of entrepreneurial potential in the absence of alternative practical measures. The authors acknowledge that entrepreneurship is a much more complex concept than that measured by business creation and self-employment, and can be observed in other circumstances, and indeed, results from this study illustrate this in one of the cases sampled.

three predictors include environmental as well as personality-based variables, namely: access to entrepreneurial role models; urgency of entrepreneurial intent; and desire for economic autonomy. The study explores also the relationship between these predictors and reports a comparison of the characteristics, traits and ambitions of people identified by the predictors as having high entrepreneurial potential with those identified as having low entrepreneurial potential. This comparison is conducted using a methodology suggested by Bolton and Thompson (2004, p. 298-299) to identify qualitatively various factors – namely childhood motivation, work ethic, dealing with failure, creativity, and positivity – that they claim can contribute to entrepreneurial potential.

The paper ‘predicts’ entrepreneurship by using a measurement that provides a scale of entrepreneurship potential, ranging from least entrepreneurial to most entrepreneurial (i.e., least to most likely to pursue a career in entrepreneurship). By using a scale measure other issues become identifiable, such as where development might be required or where support might be useful, in both cases at either an individual level or at a more general level using some common criterion (e.g., subject discipline, gender). The advantages of identifying entrepreneurship potential amongst students in this way include that educators would thereby be more able to target pedagogy appropriately, based on the extent to which students are already entrepreneurially-inclined (or not). There are also implications for policy insofar as development and support needs are identifiable.

2. Identifying the Entrepreneur

Various signals of entrepreneurial potential have been identified in the literature. While the aim of the current paper does not include a critique of these, as much work has been done in this area elsewhere (e.g., Atherton, 2004), there is some general consensus that both environmental and personality (or psychological) factors have an impact.

Psychological influences on entrepreneurship have long been theorised. Schumpeterian analysis defines the entrepreneur as ‘special’ or at least “emotionally and psychologically different from salaried managers” (Baum, et al., 2007, p.13). Psychological factors include entrepreneurial values, attitudes and needs (Koh, 1996), need for achievement (McClelland, 1961; Littunen, 2000), and ability to improvise opportunities and solutions (Hmieleski and Corbett, 2006). Rauch and Frese (2007) provide a meta-analysis of the role of personality on the tendency to be an entrepreneur, and conclude that “business owners as compared to other populations are higher in need for achievement, risk propensity, innovativeness, and internal locus of control” (p.53).

Elsewhere, research has identified the role of environmental influences. Hofstede, et al. (2004) note that the greatest influence on rates of entrepreneurship are structural economic and social conditions, and identify culture as an additional

factor. This is corroborated by Global Entrepreneurship Monitor (GEM) studies, whereupon macro features such as those directly impacted by a country's economy, social structure and culture account for much of the variation in entrepreneurship rates observed (e.g., Bosma, et al., 2008). However, the extent to which entrepreneurship (as opposed to business start-up) is observable amongst individuals is less clear from this kind of data. Brockhaus and Horwitz (2004) identify both personality features, including achievement orientation and high locus of control, and environmental features such as access to role models, as important influences on entrepreneurial behaviour. Similarly, Baron (2007, p.20) identifies a range of factors, "individual-level", "societal-level" and "interactive" as impacting on entrepreneurship, which he describes as a process rather than a stable state. This process involves those of high entrepreneurial tendencies exercising these during their lifetime, during which the various factors have greater or lesser relevance depending on where one is in the process (e.g., the impact of experience will increase over time). This interplay amongst influences is useful, as it suggests that to predict entrepreneurship, particularly amongst those with little experience, there is a variety of factors that should be observable at the individual level.

Each of the three predictors identified for the current study are drawn from the prevailing literature, and each further has empirically tested justification. Their origin (i.e., environmental or psychological) is identified below, but it is important to note that these are not discrete categories: the environment has an unequivocal influence on the development of the personality (e.g., Baum, et al., 2007).

1. Access to entrepreneurial role models (environmental factor)

Scott and Twomey (1988) note that students whose parents own a business are more likely to want to start a firm or become self-employed than other students. Similarly, Hout and Rosen (2000) and Dunn and Holtz-Eakin (2000) find that parents who are in business often act as role models and influence their offspring's decision to become an entrepreneur. Numerous researchers corroborate that role models are critical to entrepreneurial potential (e.g., Brockhaus and Horwitz, 2004; Baron, 2007).

2. Urgency of entrepreneurial intent (personality-based factor)

As identified, Baron (2007) regards entrepreneurship as a process, therefore it involves entrepreneurial behaviour prior to business start-up, and indeed, he identifies that business success is unlikely to be early in this process as learning and experience are key elements of the successful entrepreneurial business. This is consistent with Steiner (1998) who claims that many high profile entrepreneurs became involved in the commercial process (in one form or another) at a very young age. Urgency to start a firm, or in some other way practice autonomous value generation is, according to Timmons and Spinelli (2007, p.10)

characteristic of the entrepreneurial type, and they corroborate this by identifying that “entrepreneurs commonly go through false starts or even failure at first in the trial-and-error process of learning the entrepreneurial ropes” (p.19) most commonly during their 20s (p.17). While the average age of the founder of a successful business is mid 30s, there is growing consensus that this is a stage in a greater entrepreneurial process and that entrepreneurial intent and behaviour are identifiable earlier (van Gelderen, et al., 2005).

3. Desire for economic autonomy (personality-based factor)

The desire for economic autonomy varies from individual to individual and between the genders as a motivational factor. Locus of control (Rotter, 1966) is the degree to which individuals feel in control of their own destinies, and can be affected by internal (psychological) and external (social, environmental) circumstances. While debate about the applicability of the theory of locus of control to entrepreneurship continues (Chell, et al., 1991), several researches have found high locus of control to be a common personality trait of entrepreneurs (e.g., Llewellyn and Wilson, 2003). Further, other studies such as Collins, et al. (2004) have shown that items which suggest high locus of control, e.g. “desire to be my own boss”, correlate with entrepreneurial potential.

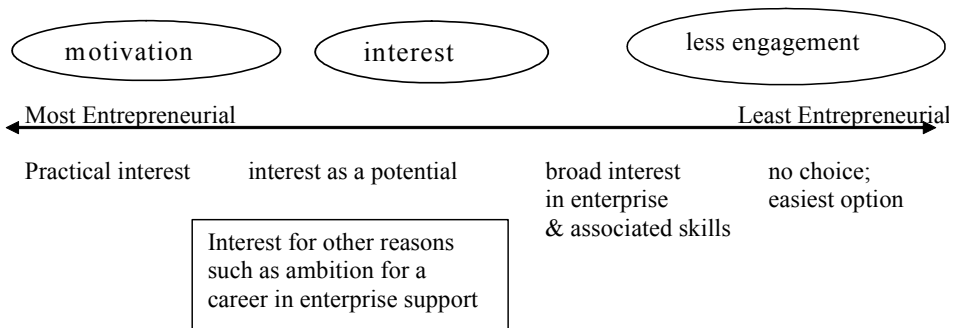
3. The Implications for Entrepreneurship Education

Entrepreneurship education can affect many of the summarised entrepreneurship influences noted in the previous section: role models can be provided, directly via guest speakers and case studies and indirectly via abstract study; entrepreneurship education can inspire urgency in entrepreneurial intent or at least contribute to the quality of early entrepreneurial attempts; and education can contribute to knowledge about, and skills development that affect perceptions of control and self-efficacy such as confidence, initiative, and problem-solving ability (Galloway, et al., 2005b). While much effort has been made in terms of provision and pedagogy development, some authors, for example Gibb (1996), Chell and Allman (2003) and Kirby (2004) have questioned the effectiveness of entrepreneurship education in meeting appropriately the needs of an entrepreneurial society.

Entrepreneurship education in Higher Education is delivered in many different ways and to a wide variety of students in terms of discipline studied, experience and background. There have always been those who are able and equipped to create businesses and develop them to become valuable economic contributors – there have always been individuals known as entrepreneurs. With reference to the nature or nurture debate (e.g., Henderson and Robertson, 2000), these individuals would be entrepreneurial regardless of educational, career, or other tangible life choices. In university entrepreneurship classes, it is reasonable

to assume a proportion of students of this ilk, particularly if the class is elective, as logic supports the idea that they would be interested in practicing their skills within education, and would be open to the learning and potential for other opportunities the university might provide. Further along what might be perceived as a continuum of interest are those individuals who may be interested, but not yet fully committed to an entrepreneurial career due to perceived lack of skills, opportunities, etc.. This continuum might continue through to the pole position populated by those who choose entrepreneurship as a topic of study for reasons not directly related to pedagogy or learning, such as having few or no other options or being attracted by a lack of examination (if applicable). This continuum of reasons for participating in entrepreneurship education at university is presented in the following typology, where the continuum is supplemented by other reasons for participating.

Figure 1: Reasons for participating in entrepreneurship education at university



To develop entrepreneurial potential in students, and thereby move students towards the entrepreneurial end of the continuum, it would be sensible to understand the reasons for their participation.

4. Hypothesis Generation

Based on the assumptions made previously about different students having different reasons for participating in entrepreneurship education, and different expectations with regard to careers, the following hypothesis is generated.

H1. Using the three predictive criteria selected for study, 'access to entrepreneurial role models', 'urgency of intent' and 'desire for economic autonomy', variation in entrepreneurial potential amongst those who have participated in entrepreneurship education will be observed.

While Hypothesis 1 seeks to identify variation of entrepreneurial potential, Hypothesis 2 seeks to explore further the three predictors and any relationships between them as they occur in individuals.

H2. There will be observable relationships between the predictors 'access to entrepreneurial role models', 'urgency of intent', and 'desire for economic autonomy'.

Hypothesis 3 is generated to compare results from this study with previous research that has shown that entrepreneurial ambition and potential varies by degree subject of student. For example, Galloway, et al. (2005a) found that while rates of entrepreneurial ambition show little variation, the time expected to start a firm is longer for those studying within Science and Engineering disciplines than in Business/Management. As immediacy of intent to realise entrepreneurial ambition forms part of the measurement of entrepreneurial (as opposed to venture start-up) potential in the current study, this affords the hypothesis:

H3. There will be variation of entrepreneurial potential by subject discipline of the student.

Using Hypothesis 1 to identify variation in entrepreneurial potential, the following three hypotheses are generated to explore similarities of traits and experiences amongst those with high entrepreneurial potential scores and differences from those with low entrepreneurial scores. Thus:

There will be variation between those who have high and those who have low entrepreneurial potential scores in terms of their:

H4. experience of independent value/money generation already (e.g., during childhood).

H5. attitudes to work and to obstacles

H6. means of dealing with failure

5. Methodology

5.1. Sample Creation and Quantitative Method

The sample comprises students at one university who have completed an entrepreneurship module.³ Modules vary in terms of their content, but all refer

explicitly to the phenomenon known as entrepreneurship and all provide some opportunity for experiential learning by simulating at least part of the entrepreneurship process. Based on responses to various questions designed to represent the three entrepreneurial predictors identified for investigation each student was given a score to measure their entrepreneurial potential. Table 1 shows the questions, the predictor each refers to, and the variable created for analysis purposes.

Table 1: Questionnaire data relating to the three predictors

Question	Variable	Predictor
Do you know someone who owns a business? If so who?	ROLE MODEL	Access to entrepreneurial role models
Do you aim to start a business or become self-employed at some point in your career? If so when?	AMBITION	Urgency of entrepreneurial intent
Have you had a business idea and to what extent did you pursue it?	IDEA	
Have you always wanted to be your own boss?	DESIRE	Desire for economic autonomy

The research instrument afforded students the ability to place responses to questions on continua ranging from ‘weak entrepreneurial signal’ to ‘strong entrepreneurial signal’ in order to measure variation. A score was accorded to each variation within each item, and cumulatively the four research items created a measure of entrepreneurship potential, with an overall cumulative lowest entrepreneurial score of 0 and a highest entrepreneurial score of 15 possible. Specific details about the calculation of entrepreneurial potential scores are given in Appendix 1.

The sample from which scores were calculated comprised 437 respondents. 264 respondents answered all four questions and could be assigned a total score. Table 2 shows how these respondents were distributed across subject area.

Table 2: Percentage of respondents across broad subject area (N in parenthesis)

Subject discipline (N=264)			
Engineering	Science	Business/ Management	Other
26.9% (71)	22.3% (59)	42.8% (113)	8.0% (21)

- i.e., a unit of assessed teaching and learning comprising one quarter of a semester in a degree programme.

Analysis of this part of the research was conducted using SPSS and the application of various statistical tests, as identified throughout the following section.

5.2. Qualitative method

Using scores assigned to the sample of 264 who had answered all the relevant questions those with very high scores (i.e., 12 to 15) and those with very low scores (i.e., 0 to 6) were identified. Bolton and Thompson (2004:298-299) claim that entrepreneurial potential can be identified by qualitative analysis of various factors. These factors are:

1. early childhood motivation and extension into adult-hood
2. work ethic and approach to obstacles
3. dealing with failure
4. creativity
5. what they enjoy (are best at)

All students from the groups identified as highest scoring and lowest scoring on the quantitative measurement were contacted. Eight responded and agreed to be interviewed, five from the high-scoring group and three from the low-scoring group.

The primary aims of qualitative methodology include to “describe and analyse the culture and behaviour of humans and their groups from the point of view of those being studied” (Bryman: 1988:46), and to collect and analyse data which is “uncountable” (Cassell and Symon 1994:4). For the current study, face-to-face interviews were used as it was believed that this method would be most conducive to understanding uncountable, process data peculiar to individuals. Interviews were conducted by experienced qualitative interviewers using an informal, semi-structured technique in order to facilitate rapport and conversation. While this method is arbitrarily subjective in that generalisations from individual cases cannot be made, it is “the uniqueness of individual cases and contexts [that] is important to understanding” (Stake 1995:39).

Investigative, conversational queries were used for the items 1, 4 and 5 (details of probes are given in Appendix 2). While responses to these items will undoubtedly be affected by personality-based traits, they can be investigated by way of description of self and perceptions of self. Alternatively, items 2 and 3 were regarded by the current authors to be more directly related to personality-based traits (though in turn, these will be affected to some extent by circumstances

and background). In order to investigate these, respondents were asked to relate critical incidents and how they were dealt with (including what was learnt from them). These critical incidents could then be analysed for some indications of work ethic and attitude to failure.

The Critical Incident Technique is a “qualitative research methodology that has been used successfully to identify job requirements, recommendations for effective practice, and competencies for a wide variety of professionals in many disciplines” (NATRI, 2003). It has been applied in many areas, including human resourcing (Bernardin & Brownas, 1988), marketing (Bitner, et al., 1990), and education (Wright, et al., 1994, Christie, 1998). The rationale for its use in the current study is that it can be an effective means of determining how and why decisions and actions are chosen and what effects the incident and ensuing decisions and actions have had on future behaviour. Specific critical incident questioning is given in Appendix 3.

Triangulation was achieved (in a limited sense) by the potential of the reported critical incident to corroborate discussion about the influence of childhood experience, and creativity. Further abstract questioning on how respondents react when circumstances/situations do not go to plan, or when barriers are met also afforded corroboration of analysis of the reported critical incident.

5.3. The Interviewees

The five high scoring respondents are summarised:

Respondent A

Respondent A is a male post-graduate in his early twenties from a Muslim country where various legalities prohibit full Capitalist activity. He intends to return to his home country upon completion of his studies and has started the process required for a substantial entrepreneurial endeavour there, using Western finance.

Respondent B

Respondent B is a final-year male undergraduate student in his thirties who was brought up in a Communist state, and emigrated to Western Europe when he was seventeen whereupon he started a firm as a result of perceived economic discrimination. After several years of various venturing experiences he came to the UK to study and has started several firms alongside this.

Respondent C

Respondent C is a final-year male British undergraduate in his early twenties from a relatively comfortable background. He has been running a firm based on

an opportunity he perceived while at university. His intentions are to complete his degree and expand his business to national and international markets.

Respondent D

Respondent D is a male European postgraduate in his late twenties. He became involved in self-employment as an IT/software specialist, and has been the co-owner of a firm in his country of origin as a result of the reputation he had built. He plans to start his own software firm upon completion of his studies.

Respondent E

Respondent E is a male in his early twenties from an Asian country to which he has returned since completing his studies. He is now a director in his family's manufacturing firm and has led substantial expansion, with further plans to pursue growth through diversification.

The three low scoring respondents are summarised:

Respondent X

Respondent X is a final-year female UK undergraduate student in her early twenties. She is a single parent and though she has had a variety of part-time jobs, she relies on her parents for much financial support. She aims to gain graduate training employment in a large organisation, preferably human resources-related.

Respondent Y

Respondent Y is a final-year UK male undergraduate student in his early twenties. He is skilled in IT and provides IT support and consultancy to his personal network, for which he is sometimes paid. He aims to pursue further study upon completion of his degree, and eventually an academic life.

Respondent Z

Respondent Z is a final-year UK male undergraduate in his early twenties. He has never had a job and relies on student loans and his parents to support him. He hasn't yet decided what he would like to do upon completion of his degree.

6. Results

6.1. Quantitative Results

H1. Using the three predictive criteria selected for study, 'access to entrepreneurial role models', 'urgency of intent' and 'desire for economic

autonomy', variation in entrepreneurial potential amongst those who have participated in entrepreneurship education will be observed.

Using the methodology described above, from the sample of 264 student respondents, three categories of entrepreneurial potential were assigned. These provide a positive result for Hypothesis 1, as shown in Table 3.

Table 3: Groupings by 'Entrepreneurial Potential' score

Score	Range label	Number of students	Proportion of sample
12-15	"high potential for entrepreneurship"	12	4.5
7-11	"Potential but less likelihood for entrepreneurship"	120	45.5
0-6	"Least likely to be entrepreneurs"	132	50

As outlined in the previous section, five of the twelve respondents in the high-scoring category were interviewed and all were found to be involved in entrepreneurship to some degree. Therefore, it is highly plausible that the instrument does predict entrepreneurship with accuracy and that entrepreneurship potential is variable among students. Further, the relatively few in the high-scoring category is consistent with the idea that those who have high entrepreneurial drive are "special" (Bolton and Thompson, 2004: 4).

As with most student cohorts, there is a wide variety of backgrounds amongst students sampled including various national, cultural and social origins. As such we would expect that socio-cultural issues are, to some extent, responsible for trends in entrepreneurial potential, as discussed earlier in this paper. While it is outside the scope of this paper to test various demographic features for their effect on entrepreneurship, one of the most interesting observations is that amongst the high scoring group, half (i.e., six of the twelve) are students from overseas. As non-British students accounted for only 27.3 percent of the total sample, this is interesting. Certainly it is consistent with Levie (2007) who found amongst ethnic minorities that it is migration rather than minority status that correlates with entrepreneurship. Being willing to travel to another country to realise educational/business potential may in part rely on similar personality factors that are relevant to developing an entrepreneurial lifestyle. Alternatively, it may illustrate a relatively (internationally) low rate of British entrepreneurial ambition and propensity. Data are too few in the current study to afford comparison by country of origin, however, the finding suggests that further work in this area would be justified.

H2. There will be observable relationships between the predictors 'access to entrepreneurial role models', 'urgency of intent', and 'desire for economic autonomy'.

A Pearson correlation (Table 4) was conducted on the total sample of 437 to explore any relationship between the four variables created to represent the three predictors. A Bonferroni correction for multiple analyses shifted alpha to .0083.

Table 4: Correlations between the four predictor variables (N in parenthesis)

	ROLE MODEL	AMBITION	IDEA	DESIRE
ROLE MODEL				
AMBITION	.082 (292)			
IDEA	.108 (344)	.405* (301)		
DESIRE	.094 (328)	.316* (288)	.287* (341)	

* significant at $p < .0083$

Table 4 shows that having a role model is unrelated to urgency of entrepreneurial intent (AMBITION and IDEA) or desire for economic autonomy (DESIRE). While this study examines student motivations and therefore has no concrete outcome variable for entrepreneurial success, IDEA could be considered to be the first step in creating entrepreneurial success and could be used as a predictor variable. Therefore, a regression analysis using forced-entry method was carried out to determine if ROLE MODEL or DESIRE were significant predictors in starting a business or having a business idea. A significant model was observed ($F(2,322) = 17.3, p < .0001$) with an adjusted R squared of .091. ROLE MODEL did not significantly account for variance in IDEA with a standardised Beta weight of .075 ($t = 1.4, p > .10$). However, DESIRE did reach significance with a standardised Beta weight of .296 ($t = 5.56, p < .0001$).

AMBITION may also be used as a predictor variable. Previous studies, such as Autio, et al. (1997), and Ajzen (1991) have shown that, as a methodology, analysis of intent (Theory of Planned Behaviour) can be a useful tool in determining future actions. Further, Armitage and Conner (2001) conducted a meta-analysis across 185 studies which used the Theory of Planned Behaviour and found that the average correlation between intention and behaviour approached a large effect size at $r = 0.47$. Consequently, a regression analysis using forced entry method was conducted using AMBITION as the dependent variable and ROLE MODEL and DESIRE as the predictor variables. A significant model was observed ($F(2,271) = 15.6, p < .0001$) with an adjusted R squared of .096. ROLE MODEL did not significantly account for variance in IDEA with a standardised Beta weight of .042 ($t = .716, p > .10$). However, DESIRE did reach significance with a standardised Beta weight of .313 ($t = 5.40, p < .0001$).

The above analyses suggest that although we utilise all three hypothesised predictors of entrepreneurial action in identifying cases for qualitative analysis,

when the inter-relationships between these factors are examined it is desire for economic autonomy that is the most useful factor. This is the only one that shows a robust difference across subject area and it predicts almost ten percent of the variance associated with the two other factors which may be more direct indicators of entrepreneurial success: intention to become a business owner, and actually starting a business or having an idea for a business start-up. Although having a role model is commonly reported to be an important predictor, it seems unrelated to the other more psychological factors in this analysis. It may however be an important predictor in aspects of business success other than intention and ideas.

H3. There will be variation of entrepreneurial potential by subject discipline of the student.

Hypothesis 3 is supported by the data, as illustrated in Table 5.

Table 5: Variation in entrepreneurial propensity by subject discipline: proportion of each categorised by “entrepreneurial potential” measurement

	Engineering (N=71)	Science (N=59)	Business/ Management (N=113)	Other (N=21)
Likelihood for entrepreneurship	1.4*	8.5	4.4	4.8
Potential but less likelihood for entrepreneurship	33.8*	45.7	54.9	33.3
Least likely to be entrepreneur	64.8*	45.8	40.7	61.9

* entrepreneurial potential scores of Engineering students significantly (\pm 95%) different for equivalent scores in Business/Management and Science

Table 5 suggests that students of Engineering are less likely than students of Business/Management and Science (including IT) to fall into the higher “likelihood for entrepreneurship” category, and accordingly, more likely to fall into the “least likely” category. This is consistent with findings in Galloway, et al. (2005a) which showed that where Engineering students did claim to want to start a firm, they tended to claim that they would do so after a substantial time period. Keogh and Galloway (2004) suggest this is likely to be influenced by relatively long lead times to start-up opportunities within these disciplines’ professions. As the current study, in measuring entrepreneurial (rather than business start-up) potential, uses urgency of start-up intent as an indicator, the current result suggests that while business start-up may well be on the career agendas of Engineering students, it would appear that their intentions are less

entrepreneurial that Business/Management and Science students. To explore this further the relationships between the predictive criteria and subject discipline were examined.

Table 6 shows the mean values for the four ‘entrepreneurial signals’ and the Total Score, distributed across subject area. These scores are based on all available data from the 437 respondents.

Table 6: Mean score for entrepreneurial signals and total across subject area (standard error in parenthesis, N in italics)

	Engineering	Science	Business/ Management	Other
ROLE MODEL	2.10 (.17) <i>81</i>	2.44 (.17) <i>79</i>	2.51 (.12) <i>156</i>	2.36 (.27) <i>33</i>
AMBITION	1.12 (.10) <i>130</i>	1.64 (.13) <i>77</i>	1.38 (.10) <i>136</i>	1.40 (.23) <i>24</i>
IDEA	0.95 (.13) <i>84</i>	1.42 (.14) <i>77</i>	1.23 (.10) <i>163</i>	1.59 (.21) <i>34</i>
DESIRE	1.13 (.11) <i>79</i>	1.56 (.11) <i>78</i>	1.64 (.08) <i>153</i>	1.28 (.17) <i>32</i>
TOTAL SCORE	5.24 (.35)	6.89 (.38)	6.83 (.28)	5.38 (.64)

Those with a Science background show the highest total score though there is no clear pattern emerging from the sub-factors in Table 6⁴. A oneway ANOVA was calculated for each variable with subject area as the Independent Variable and a Bonferroni correction for multiple univariate analysis shifted alpha to .01.

There was no main effect for ROLE MODEL ($F(3,345) = 1.32, p > .10$), AMBITION (which approached significance ($F(3,363) = 3.73, p = .011$)) or IDEA ($F(3,354) = 3.10, p = .027$). DESIRE showed a significant main effect ($F(3,338) = 5.71, p < .001$) and Tukey post hoc tests demonstrated that Engineering students have a significantly lower desire to be their own boss than Science or Business/Management students ($p = .022$ and $.001$, respectively). This difference in the DESIRE score moderates a similar pattern of significance for TOTAL SCORE. Hence a conservative summary of the above data is that the predictor ‘desire for economic autonomy’ is the only factor which demonstrates a robust difference across subject area.

6.2. Qualitative Results

There will be variation between those who have high and those who have low entrepreneurial potential scores in terms of their:

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4. The current study includes IT students in the Science category. While data are too few to allow specific discipline comparison, it is noted that entrepreneurial potential scores, where they are high within the Science category, are most represented by students of IT. New technology and IT-related industries and an emerging culture of technology entrepreneurship might explain this, however, it is not in the scope of the study to test this.

H4. experience of independent value/money generation already (e.g., during childhood).

H5. attitudes to work and to obstacles

H6. means of dealing with failure

Hypothesis 4 is supported in that there is variation between those identified as having highest and lowest entrepreneurial potential in terms of experience of independent value/money generation. High-scoring Respondent A claimed to have had his first business experience at the age of five or six, whereupon he sold stickers at profit to friends. Similarly, while commercial opportunities were not possible within Communism for Respondent B, upon entering a Capitalist nation, he had set up a food retail concern within five years. Respondent D had worked in a firm, had developed innovation and had been offered a partnership in a business prior to going to university. Alternatively, Respondent C and Respondent E reported no previous experience of autonomous economic activity. Since both of these respondents have relatively wealthy backgrounds, there is some suggestion that where there was no need to generate value, none was generated. Certainly there is an extensive literature on the differing motivations for business start-up, from the 'push' disadvantage position of what GEM calls 'necessity entrepreneurship', to the 'pull' motivations of 'opportunity entrepreneurship' (e.g., Bosma, et al, 2008). It may be that in these cases at least, push influences have an effect on those who experience the associated disadvantage earlier than those who are less motivated to economic action by necessity. If this is the case, it calls into question the extent to which 'Urgency of intent' is indeed a personality-based predictor as it appears disadvantage as a result of environmental conditions prompts entrepreneurial activity soonest. This picture is further complicated when we consider the experience of Respondent D, who also enjoyed a wealthy background (relatively-speaking), but created value in addition. There may be grounds to suggest that there are various mechanisms at play: Respondents A and B seem to have been driven by adversity to search for opportunities; Respondent D sought opportunities in a field in which he had personal interest; and Respondents C and E vary from this in that they do not seem to have been looking for opportunities in the same way. Thus, entrepreneurial ambitions appear to have been borne out of different stimuli, and reaction to the external environment seems to affect the timing of the trigger to entrepreneurial intent. From an entrepreneurial learning point of view this is interesting as all five of these informants had by the time of interviews some experience of entrepreneurship, claimed to be highly independently motivated, and expected never to work in employment. However, the manner by which they came to exhibit this desire for autonomy varies. It may be the case that economic autonomy, however it is achieved, leads to the desire for further economic autonomy, and an aversion to not having it.

When we consider the three low scoring respondents, none had generated any value. In fact, two of the three had never had a job. It must be noted here that the instrument might not just provide a measure of entrepreneurial potential, it might provide also a measure of degrees of economic responsibility for oneself. All three of the low scoring respondents had relied on parents, grants and loans to fund their lifestyles even though not all were from relatively wealthy backgrounds. For example, Respondent X as a single parent is desirous of economic activity, but relies on parents to finance the means by which it will be achieved. This respondent can thus be compared directly with Respondent C who had much the same attitude until opportunities arose and he experienced independent value generation. Similarly, Respondents Y and D both had interests in the same field. For Respondent Y this interest has remained an interest, despite the experience of opportunities for value generation. Respondent D on the other hand has actively pursued opportunities. The implication here tends towards the idea that rather than macro-economic circumstances triggering entrepreneurship, it is individual-specific circumstances, including personality, that direct entrepreneurship. Thus, the current paper is not implying that the external environment does not affect rates of entrepreneurship, but results do imply that regardless of the external circumstances, entrepreneurship occurs if opportunities are sought, or if opportunities experienced by individuals prompt an entrepreneurial reaction, most likely awakening or perpetuating a desire for economic autonomy.

Results for H5 suggest that there are some strong similarities amongst the five high scoring cases in terms of their attitudes to work and to dealing with obstacles, and that these vary from the three low scorers. To illustrate, all respondents were asked to relate a critical incident that had shaped their current circumstances. The critical incidents of the respondents are given:

Respondent A

“I had to do a work placement. I had one interview and I didn’t get it. I had just joined British Gas though, as an office worker, so I went to them and I asked them if they could give me a placement. They gave me one as an analyst. I looked for a solution you see.”

Respondent B

“I was talking to a friend about this idea I had and he bought me a book about starting a business. It seemed easy. I needed customers so I sent out CV’s. Nothing happened for six months, but then I get this job for £4k for a week’s project – I didn’t get it, but I realised the potential of the market and started to get organised. I sent out 1800 CV’s and started to project a better image by asking for reactions – positive or negative – you can learn from. I adapted and learnt how to make the business look better, lower prices depending on the location of the customer, and who to avoid.”

Respondent C

“I hated school and I was dysfunctional. I left and went to college and I was much more suited to it...everything was more relaxed. I like learning, it was the school atmosphere that was the problem. I went to college for a specific course and that suited better in terms of learning and enjoying learning.”

Respondent D

“I was at university...studying for my degree. The company contacted me and asked if I would head up a team for them, as staff... I would only go as a director... they needed me more. It was too good an opportunity. I got a partnership and did the work, but I did it after uni. I decided to do both and learned a lot about working with a team and being reliable. I had to work very late sometimes and I worked hard at it”

Respondent E

“There was a new project to expand the plant. Perseverance was required and we could get 300k from Delhi where we had nothing, so we went to Delhi”

Respondent X

“Having my son at 19. Its made me more resilient and focussed on achieving...having to put him first and the need for a secure financial and home life. I need to prioritise my time”

Respondent Y

“Can’t think of one. I suppose choosing Physics over other courses. I did it because it sounded interesting”

Respondent Z

“Nothing really. I’m not really aware...I suppose I changed courses...after first year. I didn’t want to do Chemistry and I had some Physics anyway, so it seemed like the easiest option”.

The first and most obvious observation from these scenarios is that Respondents Y and Z were essentially unable to cite any critical incident, and opted to relate scenarios where they had to make a decision. Unlike critical incidents, however, these decision-based scenarios have not lent themselves to learning in the same way as the critical incidents cited by Respondents A, B, C, D, E and X. In Respondent A, B, C, D and E’s cases the critical incidents all show how a situation was resolved, and in all cases this was by activity on their part. Other similarities include that these respondents all evidence independence of attitude to work. Similarly, A, B, C and D’s critical incidents are all based on the identification of a problem and an independent, proactive approach to solving it. Respondent E infers risk and activity to achieve a specific goal. This infers a

strong degree of perceived control over (or at least responsibility for) outcomes. This is consistency with theories of locus of control (Rotter, 1966) and need for achievement (McClelland, 1961).

Following on from H5, investigation of H6 showed similarities between the high scoring respondents in terms of dealing with failure. As well as that noted within the critical incident scenarios above, respondents were asked directly about their means of coping with failure. Responses are given:

Respondent A: “whatever the situation you always have opportunities and always have options.”

Respondent B: “if you know the final objective you will find a way round it.”

Respondent C: “I go with it when things go wrong, but I try to minimise the loss. I talk to people, reason with them. I work on a fairness principle and usually there’s a way”.

Respondent D: “I talk to people. I don’t get upset. Its important to know what’s going on”

Respondent E: “Be friendly”

Respondent X: “Have an alternative plan in mind. I’m not negative, but I’m aware of ‘what ifs’. I try to find out more about things and keep an open mind”

Respondent Y: “Accept the loss and move on”

Respondent Z: “Procrastinate until things have to be solved”.

Respondents with high entrepreneurial potential scores again exhibit the need for activity on their part to resolve problems, and all display a generally positive attitude to emerging issues. Several high scorers reported communication with other people, and the usefulness of gathering as much information as possible. This is consistent with ideas about using knowledge and networks (Swan, et al. 1999). Additionally, the implication for several of the high scorers was that obstacles can be learning experiences. For example, Respondent B’s venture failed, but he identifies from this a series of issues from which he has learnt. Conversely, neither low scoring Respondents Y or Z relate that problems are met with prompt activity, instead they tend to accept problems or failure as inevitable, and neither imply that they might comprise learning experiences.

The finding that high scoring respondents perceive that problems have potential solutions, or are learning experiences from which to inform further means of reaching objectives is consistent with the literature on entrepreneurial

personality. However, as a low scorer, Respondent X's answer also exhibits the same positive, problem solving tendencies as the high scorers. This anomaly will be discussed in the final section of this paper.

7. Discussion and Conclusions

Results corroborate findings in the literature in terms of entrepreneurial characteristics and drivers, and suggest that the three predictors studied are a good means by which to determine those most likely to pursue entrepreneurship.

The current research suggests further that entrepreneurship potential can be influenced best if it is viewed as a spectrum of potential, dependent on circumstances, experiences and other variables of complexity in the context of a person's life. Quantitative results show that students of all disciplines might have entrepreneurial intentions, though in line with previous studies, this is less common amongst those in engineering disciplines than elsewhere, and has implications for pedagogy, in that delivery of enterprise education to engineering students to be effective either has to enhance perceptions of the availability of entrepreneurship as a career, or focus on enterprise skills development for application in existing organisations, at least for early career.

As Bolton and Thompson (2004) anticipate, qualitative results show consistency between those who are measured as having entrepreneurial potential and studies of actual entrepreneurs. It would appear that the circumstances and traits that have driven and continue to drive 'real life' entrepreneurs can be observed in students who have scored highly in terms of entrepreneurial potential. Suggestion from results in the current paper includes that those measured as having "high potential for entrepreneurship" share identifiers such as strong locus of control, high need for achievement, positive attitudes to failure and obstacles, and high levels of creativity. However, the clear division between the attitudes to problems and attitudes to work between high scoring and low scoring respondents in the current study was consistently muddled by Respondent X. In fact, the only obvious differences between this respondent and the high scorers are that Respondent X is female and had no ambitions for autonomous economic activity. This anomaly is very positive in terms of testing the instrument itself. The instrument was intended to measure those most and least likely to be entrepreneurs. The danger with an instrument like this is that what might actually be measured is the degree to which individuals are likely to be economically engaged i.e., the instrument cannot distinguish between the traits and characteristics associated with managerial or career ambitions as value-adding activities, and entrepreneurial potential. However, Respondent X exhibits the same tendencies towards value-adding activity as the high scoring respondents, but seeks to do so without the desire for autonomy and control apparently so necessary in those who are entrepreneurial, and as a result the instrument

measures this respondent as low-scoring. Since the measurement requires consistency, in that each influencing factor must be well-represented in an individual, Respondent X cannot be included in the high potential category and thus the instrument seems effective⁵.

The implications for educators include a rationale for attempting to understand how to facilitate and develop potential as it occurs in students, as it is by no means consistent. Further, there is no evidence to suggest that entrepreneurial potential is fixed even in individuals. The reasons for low entrepreneurial potential scores include an absence of role models, lack of experience of business start-up processes, and little or no desire for autonomy or ambition to start a firm. Where role models are available in the environment, and urgency of economic intent within the personality are present the drive for economic autonomy is likely to be best fostered. However, the generation of desire for independence seems to be complex. Experience of economic autonomy appears to be addictive for some people and the current study suggests that this experience can be borne of necessity or some other non-innate reason. Thus, rather than entrepreneurs always seeking opportunities for independent value-generation, in some people, it is in response to external conditions and serendipity that opportunities have been pursued, rather than by an active search. In their book on marketing and children, Mayo and Nairn (2009) identify a young entrepreneur whose stimulus was internet technology. He is cited:

if the internet was not around...I probably would not be an entrepreneur. But because I was able to do it, I will be an entrepreneur for life now (page 259).

This corroborates the contention in the current paper that the external environment is critical in terms of providing entrepreneurial stimulus, and education has an obvious role here. If for some people desire for economic autonomy is not inherently realised, entrepreneurship education can provide some of the circumstances known to encourage knowledge about and experience of autonomous value generation through access to role models, experience of the entrepreneurial process through business simulation, etc., and indeed the earlier one experiences economic autonomy, the more one might in turn exhibit urgency of intent. Entrepreneurship education should, therefore, be able to increase entrepreneurial potential amongst cohorts of students, and reinforce and further support that for those who already practice entrepreneurship.

5. The authors recognise the assumption that the motivations and indicators of entrepreneurship discussed in this paper are based on a male standard of behaviour and experience, and concede that the indicators for females may vary. With relatively few females included in the sample, the current study was unable to investigate this, however the authors believe that results for Respondent X are consistent with and applicable to the research paradigm.

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Appendix 1: Calculation of entrepreneurship potential scores from questionnaire

A) Access to entrepreneurial role models

1. Do you know someone who owns a business? If so who?	Score
I have a close family member (parent, spouse) with their own business	4
I have another relative with their own business	3
I have a friend with their own business	2
I have a colleague with their own business	1
I do not know anyone personally who has their own business	0

B) Urgency of entrepreneurial intent

2. Do you aim to start a business or become self-employed at some point in your career? If so when?
- I aim to become a business owner; I aim to become self-employed:
- within 5 years of graduation
 - between 5 and 10 years of graduation
 - after 10 years
- I aim never to become a business owner; I aim never to become self-employed

Business Owner Aim		Self employed Aim	Score
Within 5 years	+	Within 5 years	4
Within 5 years	+	After 5 years	3
5-10 years	+	Within 5 years	3
5-10 years	+	After 5 years	2
After 10 years	+	Any time	1
Never	+	Any time	0

3. Have you had a business idea and to what extent did you pursue it?

	Score
I have started a business	4
I have had an idea and conducted detailed research (items include preparation of business plan, patent application, market research)	3
I have had an idea and made preliminary enquiries (to friends, colleagues)	2
I have had an idea and not pursued it	1
I have never had an idea	0

C) Desire for economic autonomy

4. Have you always wanted to be your own boss?

I have always wanted to be my own boss:	Score
Strongly agree	3
Agree	2
Neutral	1
Disagree or strongly disagree	0

Appendix 2: Investigative, conversational probes used for Items 1 (early childhood motivation), 4 (creativity) and 5 (positivity)

“tell me about your background”

“did you make money independently as a child?”

“how did you get money when you were growing up?”

“what motivates you to work?”

“how do you deal with problems?”

“what sorts of things do you enjoy doing?”

“what sorts of things are you good at?”

Appendix 3: Critical Incident Questions

- Describe the incident
- What did the respondent do that was effective or ineffective?
- What was outcome?
- Why was the action effective or what more effective action could have been taken?
- In what way(s) has this experience informed the respondent?